

Please replace the paragraph beginning at column 1, line 10, with the following rewritten paragraph:

Espresso-type coffee makers are well known. Typically, the espresso-type coffee makers deliver hot water having an optimum temperature of approximately 96 degrees Centigrade through very finely ground coffee in a permanent filter pan, usually a metallic filter pan, using a driving pressure of 3 bar to 15 bar. Examples of espresso-type coffee makers are described and depicted in U.S. Pat. Nos. 5,280,747; 5,392,694; 4,882,982; and 5,150,645. Current technology in espresso filtration provides for a finely fenestrated permanent filter, which is typically metallic, on top of which are situated coffee grounds, 0.3 millimeters or less in particle size. This permanent filter functions to intercept most of the coffee grounds while allowing the liquid coffee beverage along with its oils and some fine particulate grounds to pass into the awaiting cup. Although such filtration of particulate matter (grounds), until presently, has been considered "state of the art" world-wide, recent proof that the lipid fraction (coffee oils) as well as the fine particulate coffee grounds which escape filtration in this previously described system, are indeed harmful to the human organism, has come to light. The compounds cafestol and kahweol (herein "C" and "K") present in the coffee oils in the fine particulate coffee grounds (both of which escape permanent filtration; see above) have been extensively studied by medical researchers and have been conclusively shown to substantially elevate serum cholesterol, triglycerides, and liver function tests. See, for example, P. Zock, M. B. Katan, M. P. Merkus, et al., *Effect of a Lipid-Rich Fraction from Boiled Coffee on Serum Cholesterol*, Lancet 1990; 335:1235-7; H. Heckers, U. Gobel & U. Kleppel, *End of the Coffee Mystery: Diterpene Alcohols Raise Serum Low-Density Lipoprotein Cholesterol and Triglyceride Levels*, Journal of Internal Medicine, (J. Int. Med.) 1994; 235:192-3; R. Urgert, A. G. M. Schultz & M. B. Katan, *Effects of Cafestol and Kahweol from Coffee Grounds on Serum Lipids and Serum Liver Enzymes in Humans*, American Journal of Clinical Nutrition (AM. J. Clin. Nutr.) 1995; 61:149-54; W. Weusten-Van Der Wouw, et al., *Identity of the Cholesterol-Raising Factor from Boiled Coffee and its Effects on Liver Functions Enzymes*, Journal of Lipid Research (J. Lipid[.] Res.) 1994; 35:721-33; E. Arnesen, N. E. Huseby, T. Brenn & K. Try, *The Tromso Heart Study, Distribution of, and Determinants for, Gamma-Glutamyl Transferase in a free Living*

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Population, Scandinavian Journal of Clinical Laboratory Investigation, (Scand. J. Clin. Lab. Invest.) 1986; 46:63-70; O. Nilssen, D. H. Forde, & T. Brenn, *The Tromso Study*.

Distribution and Population Determinates of Gamma-Glutamyl Transferase, American

Journal of Epidemiology (AM. J. Epidemiol.) 1990; 132:318-26; *Ulmann's Encyclopedia of Industrial Chemistry-5th Edition*, 1986; Vol. A7:pg. 334; M. Van Desseldorp, et al.,

Cholesterol-Raising Factor from Boiled Coffee does not Pass a Paper Filter, Arteriosclerosis and Thrombosis 1991; 11:586-93.

Please replace the paragraph beginning at column 1, line 62, with the following rewritten paragraph:

About 18% of Arabic coffee (bean) is lipid (oil). Of that 18%, 20% is composed of fatty acid esters of the diterpene alcohols known as cafestol and kahweol. The aforementioned Zock, et al. article showed that the lipid (oil) rich floating on the surface of boiled coffee raised the serum LDL-C cholesterol and serum triglycerides (both atherogenic) by 29% and 55% respectively. The aforementioned Heckers, et al. article found that subjects given 148 mg of C and K daily for one month had a 50% increase in serum LDL-C and an 87% increase in serum triglycerides. One double espresso (approximately 30 cc) can contain up to 24 mg of C and K in a single cup. Furthermore, the espresso brewing method was shown by Urgert, et al. in the *Journal of Agricultural and Food Chemistry*, August 1995 to be the most effective at extracting the harmful compounds C and K, when compared to other brewing methods, i.e. drip vs. boil vs. percolation and the like.

Please replace the paragraph beginning at column 2, line 12, with the following rewritten paragraph:

The previously cited article by Urgert, et al. confirms these results, but the studies there described are based on the C and K found in the particulate grounds found at the bottom of the coffee cup. The particulate grounds which escaped filtration were found to be potent carriers of C and K and in addition to raising cholesterol and triglycerides C and K were found to elevate liver enzymes serum ALT (alanine aminotransferase) and serum AST (aspartate aminotransferase) to a lesser extent. These liver enzymes, when elevated, can

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sub B4
A4
indicate hepatocellular (liver) disfunction and/or damage. Other researchers confirmed the adverse effects of C and K on liver function. See, for example, the Urgert, et al., Weusten-Van Der Woy, et al., Arnesen, et al., and Nilssen, et al. references cited above.

Please replace the paragraph beginning at column 2, line 26, with the following rewritten paragraph:

sub B5
A5
This evidence clearly establishes the need for a filter which can reduce the harmful oils and unfiltered grounds present in an espresso coffee beverage, which is what the invention can accomplish.

Please replace the paragraph beginning at column 2, line 30, with the following rewritten paragraph:

sub B6
A6
It has been discovered that paper coffee filters can remove substantially the C and K. in coffee beverages by filtering both the oils and small particulate grounds which have been found to contain C and K. See the Urgert, et al. and Van Desseldorp, et al. papers cited above. Prior to the invention, paper filters have not been developed for espresso-type coffee makers since they appeared to be redundant to the metallic or other permanent filter, or it was felt paper filters were unsuitable for use.

Please replace the paragraph beginning at column 2, line 40, with the following rewritten paragraph:

sub B7
A7
A principal feature of the invention is the precision of an improved filtering device for an espresso-type coffee maker.

Please replace the paragraph beginning at column 2, line 43, with the following rewritten paragraph:

sub B8
A8
The espresso-type coffee maker is of the type having a spout to deliver heated water under pressure, and a receptacle to receive the brewed filtered coffee. The filtering device has a permanent filter in the path of heated coffee passing to the receptacle. In accordance with the invention, filter paper is provided in the flow path of the liquid brewed coffee which

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sub B8
A8
removes a substantial part of the coffee oils and particulate grounds which escape the permanent filter. These substances contain cafestol and kahweol and thus, these undesirable substances are, at least partly, removed from the brewed coffee liquid.

Please replace the paragraph beginning at column 2, line 54, with the following rewritten paragraph:

sub B9
A9
Thus, one advantage of the invention is that the filtering device substantially prevents, in the consumers of its treated coffee, the raising of serum LDL cholesterol, liver enzymes (ALT), and triglycerides, all of which are potentially dangerous.

Please replace the paragraph beginning at column 2, line 59, with the following rewritten paragraph:

A10 B10
sub B10
Yet another advantage of the invention is that removal of the frequently rancid, bitter coffee oils and grounds can improve the flavor of the coffee beverage.

Please replace the paragraph beginning at column 3, line 20, with the following rewritten paragraph:

A11
sub B11
FIG. 1 is an elevational view, partly in section, of an espresso-type coffee maker incorporating the principles of the invention.

Please replace the paragraph beginning at column 3, line 23, with the following rewritten paragraph:

sub B12
A12
FIG. 2 is a perspective view of one part of the apparatus of FIG. 1, namely a disposable filter made in accordance with the principles of the invention.

Please replace the paragraph beginning at column 3, line 34, with the following rewritten paragraph:

sub B13
A13
Referring to FIG. 1, there is shown an espresso-type coffee maker, generally designated 9, with a filtering device, generally designated 10. The coffee maker 9 is of the type which delivers hot water under pressure to spouts 12, after which the heated water passes

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sub B13
A13
~~through ground coffee beans CG in the filtering device to a receptacle 14, such as a cup, which receives the heated coffee.~~

Please replace the paragraph beginning at column 3, line 41, with the following rewritten paragraph:

sub B14
A14
~~The filtering device 10 has a holding pan 16, which receives a permanent filter, such as a perforated metallic filter 18 of known type in espresso-type coffee makers. The holding pan 16 may have a rubber O-ring 20 to sealingly engage against an outer surface of the metallic filter 18 and ensure that the hot water is pumped through the coffee CG and filter under pressure.~~

Please replace the paragraph beginning at column 3, line 47, with the following rewritten paragraph:

sub B15
A15
~~The holding pan 16 has a conical chamber 22 beneath the metallic filter 18 which communicates with a passageway 26 leading to the receptacle 14. A paper filter 30 is removably placed on top of the metallic filter 18 between the coffee grounds CG and the metallic filter 18. The paper filter may be of the type sold under the trademark MR. COFFEE for conventional (non-pressurized) type coffee makers, and the filters may be cut to size to fit the base of the metallic filter 18. In a preferred form, the filter 30 may be made of a plurality of layers of the paper layers such as the two layers 31, 32 shown in FIG. 3, each of which has a conventional thickness for non-espresso coffee filters. These layers are crimped together about their perimeter as indicated at 34. This forms an easily handled, disposable, multi-layer filtering unit. Thus, the coffee grounds CG are filtered by the metallic filter 18, and the brewed coffee is also filtered by the paper filter 30 to remove harmful lipids and coffee grounds which may effect a rise in the cholesterol levels in a user of the brewed coffee. The modified paper filter 30 is preferably placed directly on the metallic filter 18, and the ground coffee beans CG are placed directly onto the paper filter.~~

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Please replace the paragraph beginning at column 4, line 3, with the following rewritten paragraph:

sub B16
Att
A prototype of the filtering device was constructed, tested, and shown to be effective. The prototype was sized and shaped to fit the espresso holding pan of a Rancilio brand machine, Model No. MISS 935624, made by Rancilio of Italy. Thus, it was approximately circular in shape with a diameter of approximately 5 cm (which, of course, can be custom made to fit any size holding pan) and was formed of two layers of standard filter paper derived from filters of the cone variety. It was, as a consequence, twice the standard thickness of conventional coffee filters.

Please replace the paragraph beginning at column 4, line 14, with the following rewritten paragraph:

sub B17
Att
Some tests were made on the filtering device 10 as follows. First, in order to determine the amount of oil in the coffee brewed without use of the paper filter, some coffee was brewed and allowed to chill in a refrigerator for two to three hours in order to allow the oils to get on the surface of the liquid air interface. Copious quantities of lipids were found on the unfiltered coffee. On the other hand, approximately 80% less lipids were found on coffee which was filtered by one layer of the paper filter 30, while approximately 95% of the lipids were removed from the coffee when two layers of the paper filter 30 were used. Negligible quantities of fine particulate coffee grounds were noted at the bottom of the cup when either one or two layers of filter paper were used compared to none. These observations are in agreement with other studies performed, such as those referred to above in the articles of Urgert, et al. and Van Desselorp, et al.

Please replace the paragraph beginning at column 4, line 38, with the following rewritten paragraph:

sub B18
Att
The foregoing detailed description is for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as modifications will be obvious to those skilled in the art.